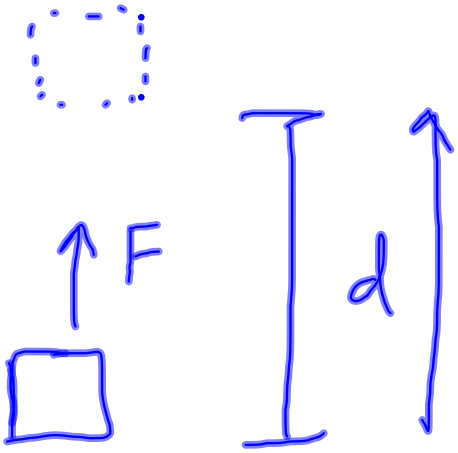
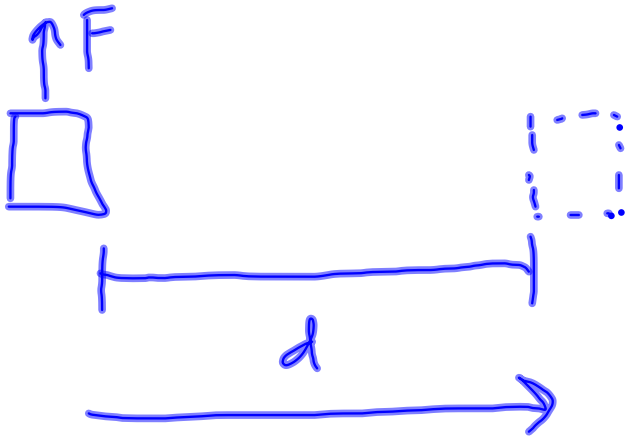
Work Review:

5.



6.



11.

Energy:

- Overall Definition: Capacity to do work or cause motion
- Units: Joule (J)

$$1\ J = 1\ N \cdot m = 1\ kg \cdot m^2/s^2$$

- Two Overall Types of Energy:
  - Kinetic: energy of motion
    - Equation: $KE = \frac{1}{2} mv^2$

Kinetic Energy ↓ mass ↓ velocity

Units: $m \rightarrow kg$

$v \rightarrow m/s$

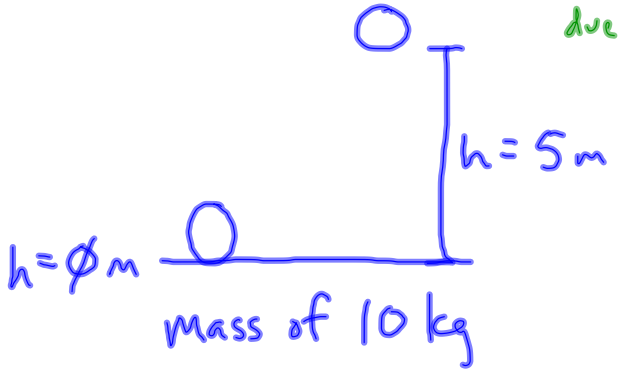
$v^2 = m^2/s^2$

  - Potential: energy stored due to position or shape
    - Each category of energy will have at least 1 way to store energy

- Seven Categories of Energy:

1. Mechanical
   - Most common in everyday experience
   - Examples: Running, driving a car
   - Kinetic energy: $KE = \frac{1}{2}mv^2$
   - Potential energy:
     - Gravitational potential energy:
       - Equation: $GPE = m a_g h$

mass
acceleration due to gravity
height



$GPE = (10\,kg)(9.8\,m/s^2)(5\,m)$
$= 490\,J$

   - Elastic Potential Energy:
     - Energy stored by things that stretch or compress

2. Chemical

- Energy associated with atoms, ions, and molecules (bonds between them)
- Think of this as potential energy, because the energy is typically used to do something else.
- Examples: Food, batteries, gasoline, fireworks

3. Electrical (formally Electromagnetic)

- Energy of electrons in a circuit (kinetic part)
- Electric potential energy comes from electric fields (same for magnetic).

4. Nuclear
   - Energy associated with the nucleus of atoms.
   - Two types: fission and fusion

5. Thermal
   - Energy associated with heat and vibration of molecules
   - Often a byproduct of some physical process

6. Light/Radiant
   - Energy associated with light and electromagnetic spectrum
   - Doesn't need a medium to travel

7. Sound
   - Energy associated with sound wave
   - Does require a medium to travel
   - Often a byproduct of some physical process